Honeywell Enraf

Installation and Service Manual

Load Computer 1010 CJ

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CHAPTER 1 RECEIPT OF EQUIPMENT

1.1 Checking of Shipment

When the equipment arrives, do the following prior to acknowledging receipt of the shipment:

- Check the outside packing case for any signs of damage. Note any damage on the carrier's shipping docket.
- Check the quantity of packing cases or shipping cartons against the carriers paperwork. Note any discrepancy on the carrier's shipping docket.

1.2 Unpacking

Even if the equipment is not to be used immediately, carefully unpack it from its shipping container and inspect it for damage or missing parts,

If the equipment is to be stored, repack it in its original container and stored it in a safe dry area.

Do not discard any packing before ensuring that there are no parts or manuals inside.

If space permits, retain the original packing retained in case the instrument has to be returned to the supplier.

1.3 Reporting of Problems

If there are damaged or missing parts immediately send a written report to the Honeywell Enraf office on which the order was placed, detailing the relevant purchase order number and the nature of the problem.

Contact details are at the beginning of this manual.

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CHAPTER 2 RECOMMENDED WIRING PRACTICES

2.1 Description

When connecting signal wires, it is good practice to use shielded cable.

In order to comply with the requirements for Electromagnetic Compatibility, as per EMC-Directive 89/336/EEC of the Council of the European Community, this wiring practice is mandatory. For more information, see "Shielding".

With the high density of wires in a typical instrument installation, careful consideration must be given to correct wiring procedures. The following advice is for guidance only—local wiring regulations must take precedence, particularly for wiring in hazardous areas.

2.2 Shielding

Shield all signal wires. Signal wires include flowmeter inputs, temperature and pressure inputs, communication interfaces, and switch inputs such as the overfill or emergency stop inputs.

Where a number of signal wires are being run in the same multicore cable and the cable run is less than 100 feet (30 meters), one overall shield is sufficient. For distances greater than 100 feet, use shielding on each signal wire.

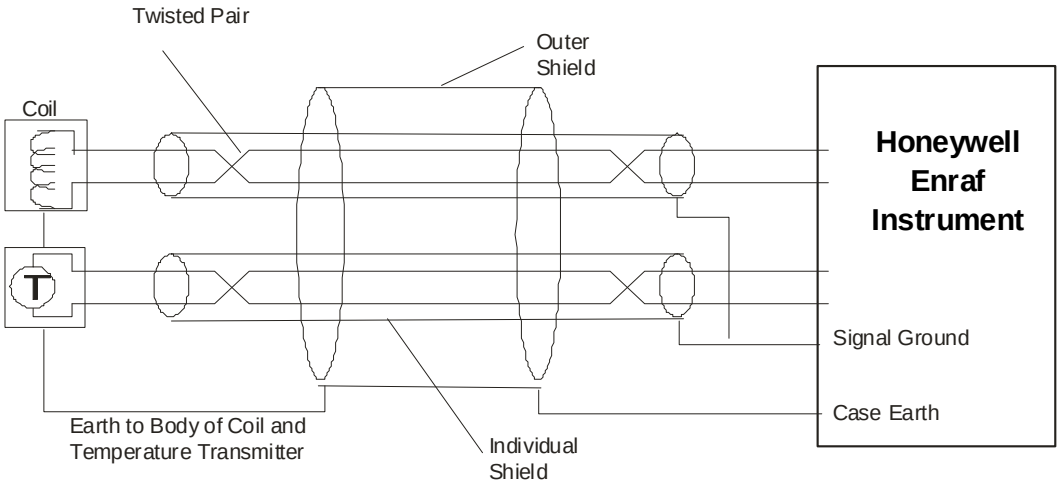
Ground the shields to the signal ground only at the instrument end. Do not make any other connection to the shield. Do not connect to earth or connect at the sensor end.

Treat remote switch inputs as signal wires and shield if run over a significant distance.

When connecting to small millivolt signals, such as those produced by turbine flow meters, or coils in paddle wheel flow meters, use shielded twisted pair wire.

Direct connection to RTD's is normally via a four wire connection on Honeywell Enraf instrumentation. Two of these wires are voltage outputs, and these wires must be a shielded twisted pair.

The following example shows a wiring run with individually shielded twisted pairs and an overall shield. The outer shield is optional, but may be necessary in a noisy environment.



To minimizes possible problems, do the following when performing electrical installation procedures:

- Connect individual shields at one end only, to prevent current paths along the shields. Protect the shield at the floating end so that it cannot short to chassis or touch other shields.
- Connect the shields to the Ex d enclosure, or, if you are connecting the shields to the field enclosure, connect the shields to the Ex e terminal enclosure.
- Overall or outer shields can be connected at either end to provide some degree of bonding, but only if there are inner shields.

2.3 Signals

Shield all signal wires. Signal wires include flowmeter inputs, temperature and pressure inputs, communication interfaces, and switch inputs such as the overfill or emergency stop inputs.

Keep signal wires as far away as practical from control wires to valves and pumps, even though the signal wires are shielded.

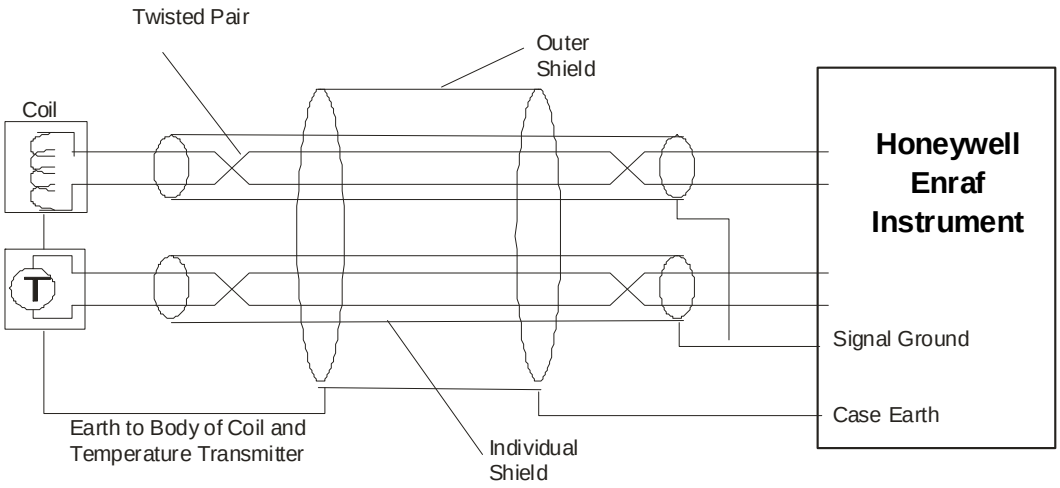
2.4 Cable Ducts

Do not run signal wires in the same cable ducts as power or control cables. No matter how well shielded the signal wires are, there is always the likelihood of picking up transients when, for example, contactors are switched in or out.

For example, with a Batch Controller, it is good practice to run the relay and power wires in one cable duct and the flowmeter signals in a separate duct.

2.5 Mains Noise

Mains noise is usually not a problem since the instruments are protected by varistors and transformers, which shield out most transients. The main consideration with mains connections is to ensure a good earth bond is made to the instrument case, and that the live mains wires are not exposed.



2.6 Locating Interference Problems

To find the source of interference, systematically disconnect each input or output until the noise source is located. There are, unfortunately, no methods other than trial and error.

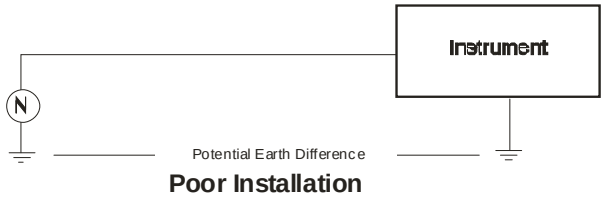
There are two ways noise can be induced:

- By conduction, for example spikes on the mains, or spikes such as those produced by switching inductive loads.
- By RF emissions, for example pickup from adjoining wires in a cable duct, emissions from welders or variable speed motor drivers.

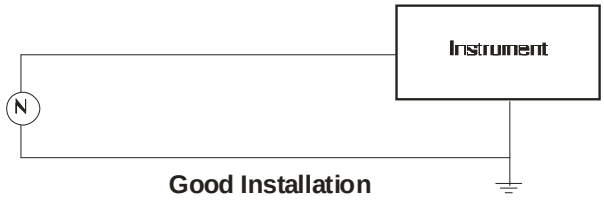
Good wiring practice is the best method of preventing noise.

2.7 Ground Loops

Whenever possible, bring all signal grounds to a single point to avoid ground loops.



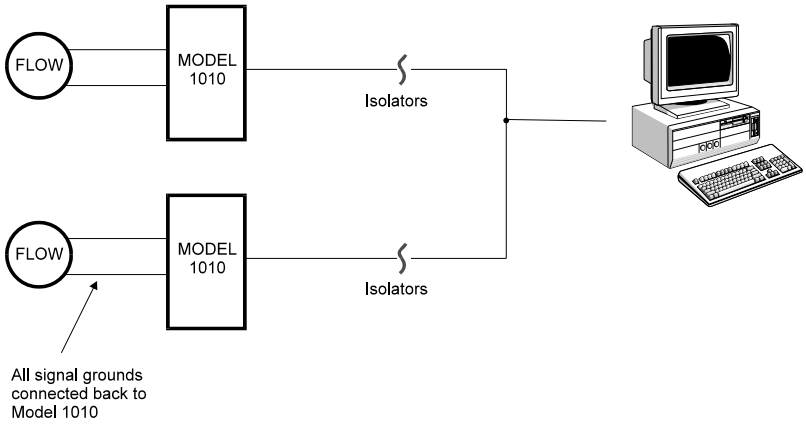
Poor Installation



Good Installation

2.8 Isolation

It is good practice to ensure electrical isolation between each instrument and to the office computer or printer to ensure there are no ground loops. To do this, use optically isolated communication buffers.



To maintain isolation do the following:

- Ensure that switching inputs (overfill etc.) are voltage free contacts.
- Ensue that power supplies on each instrument are used only to power the temperature or pressure sensors and flow meters related to that instrument.
- If external power supplies are required, use one for each instrument.
- If flow meter or temperature or pressure signals must be re-transmitted to a SCADA system, use isolators.

The Solid State relays and alarm relays are already isolated within the instrument, thereby ensuring all outputs are isolated.

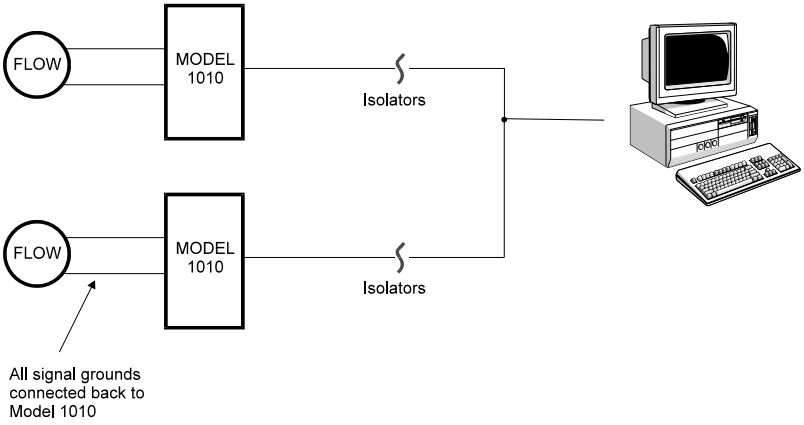
- Always isolate the RS422/232 communications.

2.9 Lightning Protection

The best protection against lightning damage is employing good isolation practices and central earthing to avoid ground loops.

Most damage is not caused by direct lightning strikes but through nearby strikes which cause voltage differences through the ground or in a building. If systems are not isolated, this can cause currents to flow through signal wires thereby causing damage.

In lightning affected areas, it is worthwhile protecting long signal runs, such as on communication lines, with lightning arresters.



2.10 RC Networks for Interference Suppression

When driving inductive loads with the electromechanical relay outputs, it is recommended that RC suppression networks (often called “Snubbers”) are used for two reasons:

- To limit the amount of electrical noise caused by arcing across the contacts that may, in extreme cases, cause the microprocessor to act erratically
- To protect the relay contacts against premature wear through pitting

RC suppression networks consist of a capacitor and a series resistor and are commonly available in the electrical industry. The values of R and C are dependent entirely on the load. However, if the user is unsure of the type of snubber to use, values of 0.25 µF and 100 ohms will usually suffice. Use only mains approved RC suppression networks.

The basic principle of operation is that the capacitor prevents a series of sparks arcing across the contact as the contact breaks. The series resistor limits the current through the contact when the contact first makes.

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CHAPTER 3 MECHANICAL INSTALLATION

3.1 Description

This chapter contains information relating to the mechanical installation of the Model 1010 instrument.

3.2 Location

If the instrument is installed in the open, provide environmental protection in the form of a sun or rain hood. The protection from direct sunlight is intended to avoid excessive heat build up within the enclosure. The enclosure is rated to IP66/Nema 4x, however protection from inclement weather conditions is beneficial for both servicing and the long term appearance of the instrument.

Avoid locations where the display is in direct sunlight. This reduces the long term life span of the display, and can make it difficult to read the display.

If possible mount above pipe joins (flanges/barrel unions) to avoid product leaking on to the instrument.

Allow room for access to cables (armoured cables have large bending radii) and to allow the instrument door to swing fully open.

3.3 Mounting

There are four M8 (metric threaded cable entries) or 5/16“ UNF (NPT threaded cable entries) at the bottom and four on top of the enclosure on 90 x 82.7 mm centres.

Make sure the mounting surface can accept the weight of the Model 1010—23 kg—and the weight of cable glands and cables when planning the mounting hardware.

The base of the enclosure should be approximately 1,200 mm from floor level.

3.4 Honeywell Enraf Pedestals

Upon request Honeywell Enraf can supply mounting pedestals specifically designed to mount the various versions of the instrument. The pedestals are of welded construction, made with heavy gauge box-form mild steel, and galvanized, to provide a robust and long-lasting structure.

3.5 Cable Glands

Use only certified cable glands and install according to the gland manufacturer's instructions.

3.6 Gland Holes

Plug unused gland holes with a certified blanking plug.

3.7 Case Bolts

Securely fasten all bolts that attach the front door of the enclosure to the rear case.

3.8 Enclosure - General Information

Do not drill holes in the enclosure

Electrically earth the enclosure. Attach the earth to the enclosure where shown in the diagrams in Appendix A.

Do not open the enclosure if an explosive atmosphere is present, as the electronics contain batteries and/or other charge storage devices that may cause a spark.

3.9 Ambient Temperature

Use the enclosures only in ambient temperatures between -10 °C and + 60 °C (-40 ºC with optional heater).

CHAPTER 4 TESTING AND COMMISSIONING

4.1 Description

After installing the instrument, you must commission it. Commissioning is essential, since it helps ensure the correct operation and the reliability of the instrument.

4.2 Pre-Power-Up Check

Before applying power to the system, check all aspects of the instrument. Give particular attention to the wiring, because the wiring is generally the most complex part of the installation.

When checking the wiring, give particular attention to the following:

- All wiring connections are made to the correct terminals
- All wiring is neat and securely fastened in the cable runs
- Individual shields are connected at one end only and insulated at the other end
- All shields are connected only to chassis earth, not signal ground
- Overall or outer shields are connected to chassis earth
- IS safety earths (if used) are connected properly
- All low voltage lines (temperature, flow meters, communication, etc.) are physically separated from all high voltage mains wiring

4.3 Hardware Test

Before attempting to deliver product using the instrument, use the Hardware Test Mode of the instrument to check all valve and pump controls, and all inputs apart from flow signals. For more information, see chapter 5 "Hardware Test".

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CHAPTER 5 HARDWARE TEST

5.1 Description

This chapter describes the operation of the built-in hardware test program in the instrument.

5.2 Hardware Test Program

To aid commissioning and fault finding, the instrument has a built-in hardware test program that allows all of the system inputs and outputs to be exercised.

CAUTION

CAUTION! The built-in hardware test program is extremely powerful and may operate any outputs such as pumps or valves, regardless of the status of any interlocks such as the overfill system.

5.3 Entering Hardware Test Mode

To enter Hardware Test Mode

1. Do one of the following:
   - Hold the '8' key down for five seconds.

     After using this method, you cannot alter certain parameters for W&M.
   - Use the switch on the instrument.

     On the Model 1010A the switch is located on the right hand side of the enclosure. This switch may be fitted with a lead tamper seal for W&M requirements.

FIGURE 3-1 Model 1010A instrument switch

If the instrument is not idle (for example, the instrument is in use by an operator, or a vehicle overfill or earth system is connected) it displays the following:

- In this case, either disconnect the permissives to bring the instrument to the idle state, or wait until loading is complete and then enter your password.

If password mode is available the instrument displays the following:

2. Enter the password ‘800’ and then press the Enter key.

   The instrument displays the Hardware Test screen.

The following options are available in Hardware Test Mode. Use the Display key to scroll through the options and the Enter key to select the displayed option.

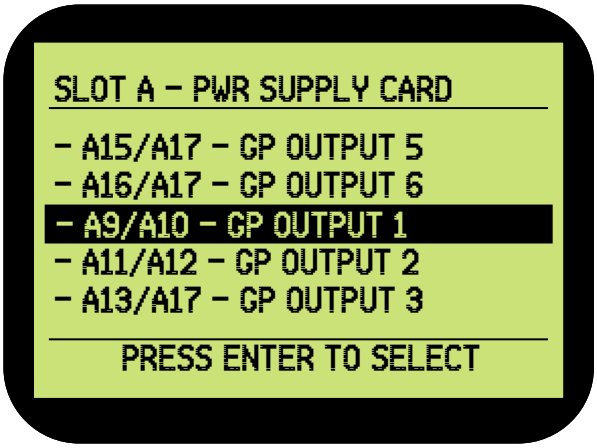
Option	Description
SLOT A—POWER SUPPLY CARD	Tests all Digital Outputs on the Power Supply Card
SLOT B—OUTPUT CARD	Tests all Relay Outputs & Digital Inputs & Outputs on the Output Card
SLOT C—INPUT CARD	Tests all Functions Flow Totals/Freq. Inputs/Temp RTD/4-20 mA Inputs/ Pressure 4-20 mA Inputs/Opto outputs & Digital Inputs on this card.
SLOT D—CPU CARD	Tests communications Ports and Touch Key, NexWatch cards, RF ID tests Functions.
INTELLIGENT ADDITIVES	Allows test injections on connected Intelligent Additive Systems
KEYBOARD TEST	Tests all keys on the 1010 keyboard
NEXKEY TEST	Tests the functionality of the NexWatch card reader.

Each of these options is described in the following topics.

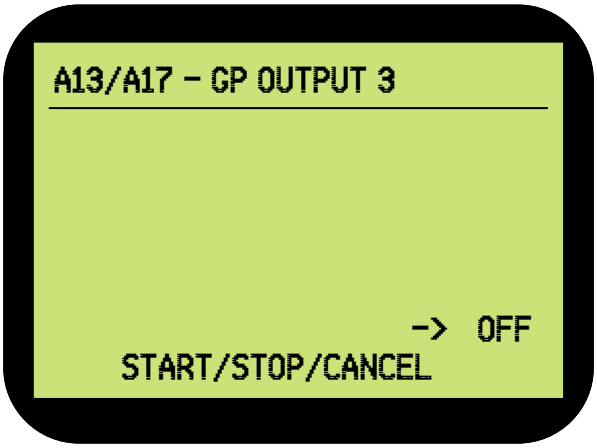
5.4 Slot A—Power Supply Card

This option tests GPL general purpose outputs on power supply cards.

When Slot A—Power Supply Card is selected, the instrument displays the following.


SLOT A - PWR SUPPLY CARD
- A15/A17 - GP OUTPUT 5
- A16/A17 - GP OUTPUT 6
- A9/A10 - GP OUTPUT 1
- A11/A12 - GP OUTPUT 2
- A13/A17 - GP OUTPUT 3
PRESS ENTER TO SELECT

Select an output. The instrument displays a screen like the following:



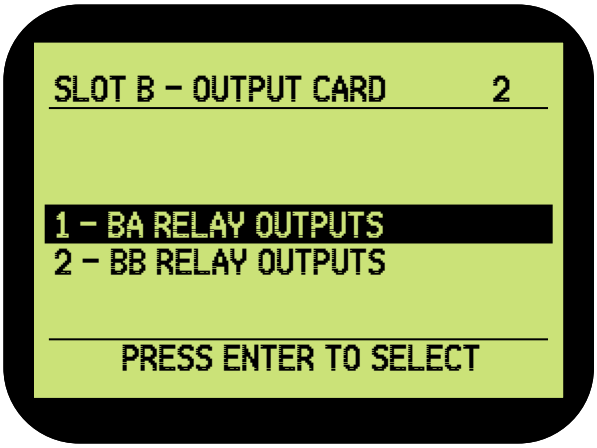
Use the START and STOP keys to turn the selected output on or off. The status is displayed in the second bottom line of the screen.

Use the Cancel key to return to the previous menu and turn the displayed output off.

5.5 Slot B—Output Card

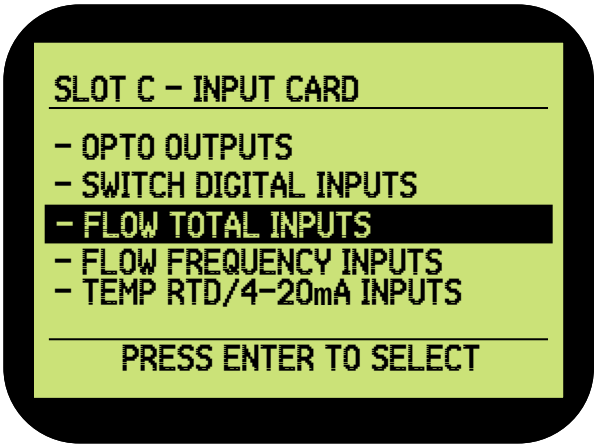
This tests the relays on the output card.

Perform this test in the same way as for "Slot A—Power Supply Card" on page 5-2.



5.6 Slot C—I/P Card

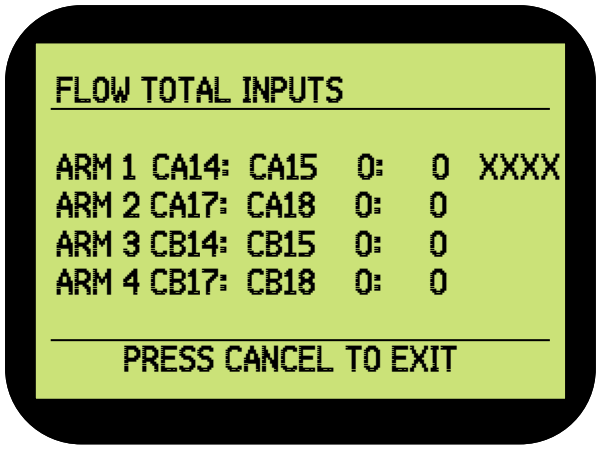
On selection of Slot C the instrument displays the following:


SLOT C - INPUT CARD
- OPTO OUTPUTS
- SWITCH DIGITAL INPUTS
- FLOW TOTAL INPUTS
- FLOW FREQUENCY INPUTS
- TEMP RTD/4-20mA INPUTS
PRESS ENTER TO SELECT

5.6.1 Flow Total Inputs

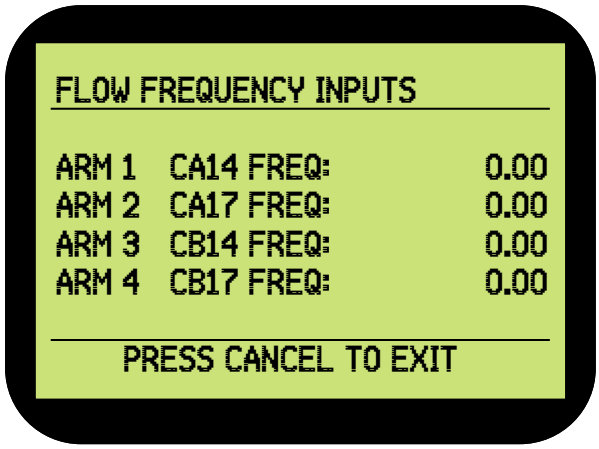
After you select this test, the instrument continually displays number of flow pulses received in the previous 100 mS interval, showing both the A&B flow totals for the four arm inputs. There is a counter in the upper right hand corner that indicates the correct operation of this mode. It

counts up to 9999 then resets to 0 and continues counting up. Press the Cancel key to exit.



5.6.2 Flow Frequency Inputs

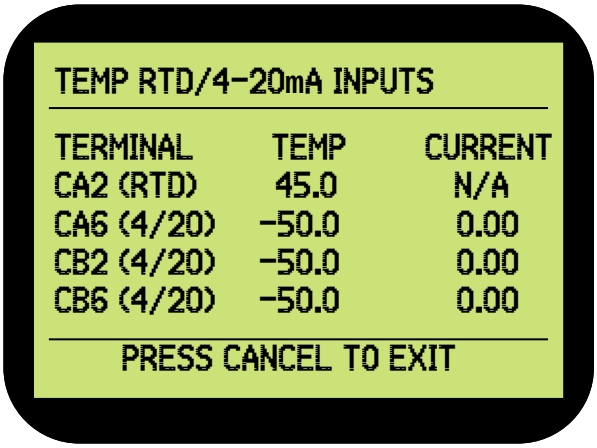
The flow rate test continually displays the frequency (in Hz) of the four flow pulse inputs. Press the Cancel key to exit.



5.6.3 Temperature RTD/4-20 mA Inputs

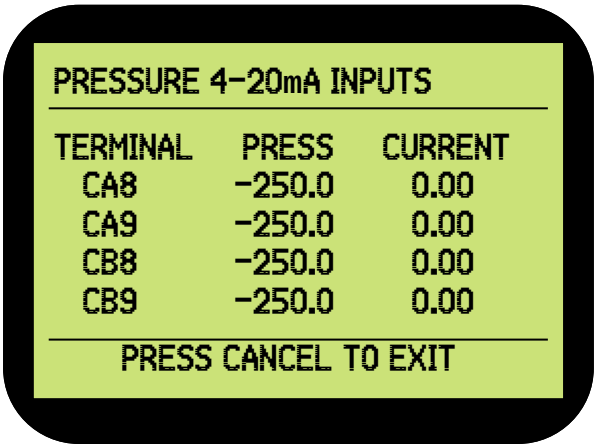
The temperature test continually displays the temperature on the four temperature inputs, using the 4-20 mA temperature range set up for

each arm in Setup Mode. If no temperature range has been set for an arm, the range –25 °C to 75 ° C is used. Press the Cancel key to exit.



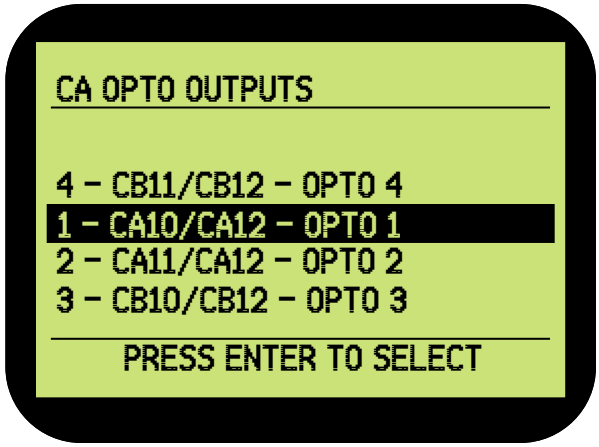
5.6.4 Pressure 4-20 mA Inputs

The Pressure test continually displays the pressure on the four pressure inputs, using the 4-20 mA pressure range set up for each arm in Setup Mode. If no pressure range has been set for an arm, the range 0 to 10343 is used. Press the Cancel key to exit.



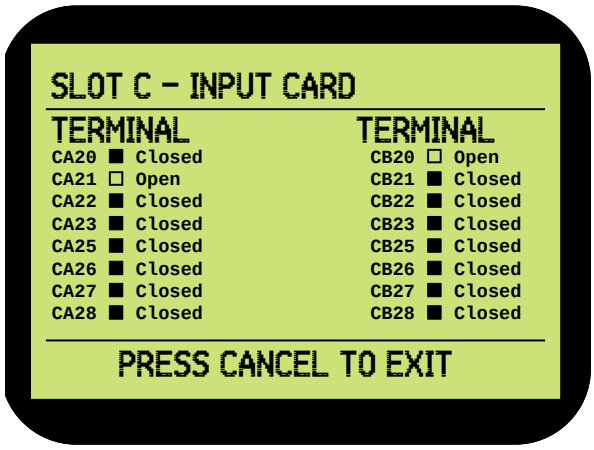
5.6.5 Opto outputs

Perform this test in the same way as for "Slot A—Power Supply Card" on page 5-2



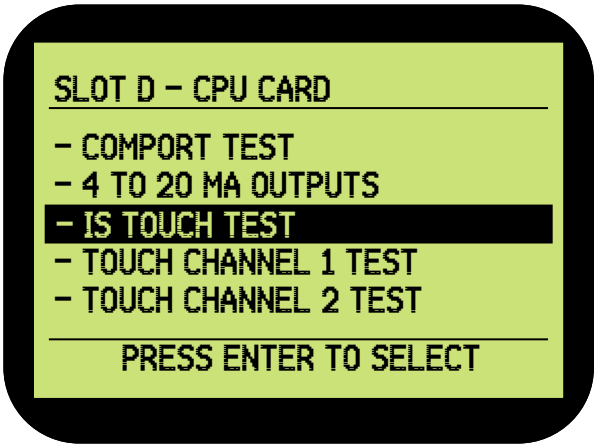
5.6.6 Switch/Digital Inputs

On being selected the status of the digital inputs are continually displayed as shown below. Press the Cancel key to exit.



5.7 Slot D—CPU CARD

Select Slot D to test the Touch Key, Touch/Input and Communication Port test functions.


SLOT D - CPU CARD
- COMPORT TEST
- 4 TO 20 MA OUTPUTS
- IS TOUCH TEST
- TOUCH CHANNEL 1 TEST
- TOUCH CHANNEL 2 TEST
PRESS ENTER TO SELECT

5.7.1 IS Touch Test

This option allows the Touch Key Reader System to be tested, it also allows the reading of Touch Keys where the key number may be partly obscured through wear.

5.7.2 Touch Channel 1 and 2 Test

This option allows the Isolated Touch Key Reader System to be tested on channels 1 and 2, it also allows the reading of Touch Keys where the key number may be partly obscured through wear.

5.7.3 Touch Input Test

This option allows the Touch Key Reader System to be tested, it also allows to test the 3 inputs on the touch key reader.

5.7.4 RF ID Test

This option allows the RF ID System to be tested.

5.7.5 Com Port Tests

There are six options listed under this test, two for each the three available communication interfaces (RS232, 422 & 485).

5.7.6 Communications Receive (RX) and Echo

The Communications Receive and Echo test allows the computer communications line to be tested by sending single characters from a PC, which are displayed on the instrument display and then echoed back and displayed on the PC.

5.7.7 Communications Send and Receive (RX)

The Communications Send and Receive test allows the computer/ printer communications line to be tested by transmitting characters entered on the instrument keyboard. A loopback connector can then be used to test a communications line by sending the characters back to the instrument display.

5.7.8 4 to 20MA Outputs

These are not available on the standard CJ Pack.

5.8 Intelligent Additives

If the intelligent additives are configured then the injectors can be tested.

5.9 Keyboard

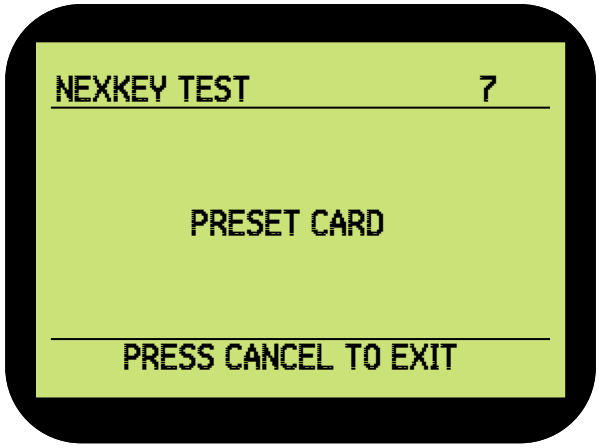
The keyboard test allows all the keys to be individually tested. The screen indicates the position of any keypress, except for the Cancel key.

Press the Cancel key to exit the keyboard test.

5.10 NexWatch Test

The Nexkey Test allows the communications link and NexWatch card reader to be tested. Present a NexWatch card to test that the system can read a card successfully.

Press the cancel key to exit the Nexkey test.



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CHAPTER 6 GENERAL SERVICING

WARNING! In hazardous areas it is compulsory to use personal protection and safety gear.
This can be: Safety helmet, fire-resistive overall, safety shoes, safety glasses, working gloves, LEL-meter.

Pay attention to the kind of product in the tank. If there is any danger for your health, wear a gas mask and take all necessary precautions.

WARNING! Take appropriate precautions when chemical or toxic product vapours are present (compressed air, chemical protection suit, detection equipment).

6.1 Description

As with most electronic devices, the instrument does not require any regular servicing, but may require modules to be changed, software updates for the addition of special functions (see CHAPTER 8), or exchange of damaged hardware.

This chapter describes some of the more common tasks that may have to be performed.

6.2 Important Notes

- Before opening any enclosure, ensure that explosive vapours and gases are absent.
- Before opening an enclosure, fully comply with all site safety instructions. As a minimum all power must be removed from the enclosure and the area declared safe by a safety officer.
- Use only Honeywell Enraf supplied components to replace parts.
- Replacing components that are critical to the hazardous area certifications may render the certification invalid.
- Ensure flame paths are clean before securing the front to the rear section of the enclosure.
- Before replacing a CPU card, record the setup parameters in case they need to be re-entered after replacing the card.

6.3 Tools Required

The following list of tools will cover most procedures which would be undertaken in the field:

- 6 mm Allen key for removing door bolts

  A 50 mm length of 6 mm Allen key fitted in a hand (non-powered) drill makes a very effective tool for removing the 16 bolts in the door in a hazardous area.

WARNING! EXPLOSION HAZARD, FIRE HAZARD Avoid the use of power drills in hazardous areas. Using power equipment in areas where there may be flammable vapour may cause explosions and fire, which could cause injury or death.

- 3 mm flat bladed screwdriver for terminal connections
- Number 2 cross recessed (Phillips head) screwdriver for removing the cover plate and internal modules
- A medium size (approximately 6 mm) flat blade screwdriver for removing EPROMs

6.4 Module Replacement

The procedure for removal and replacement of electronic modules in the main and expansion enclosures are the same, so only the main enclosure is described here.

The main instrument enclosure consists of two modules:

- The main electronics module, which is located in the back of the enclosure
- The display module located on the rear of the door

6.4.1 Main Electronics

WARNING! Make sure that all power to the device is switched off before you open the covers of the device. Failure to do so may cause danger to persons or damage the equipment. All covers of the device must be closed before switching the power on again.

☛ To remove the main electronics module

1. Read and comply with the notes in "Important Notes" on page 6-1.
2. Remove the 16 screws that are located on the front of the door with a 6 mm Allen key. The door is supported by the removable hinges on the left side of the enclosure.
3. Note the positions of the green connectors that plug into slots A, B, C and D and then remove them from the communications plate.
4. Locate the flat black 50 mm wide cable that reaches from the left rear of the module to a connector on the door and then unplug the cable from the door.
5. Remove the 4 mm Allen screws located one per corner at the rear of the module, using the 4 mm x 300 mm Allen key.

CAUTION! The earth connection is beneath one of the corner screws. Note the position of the earth connector.

6. Remove the module.

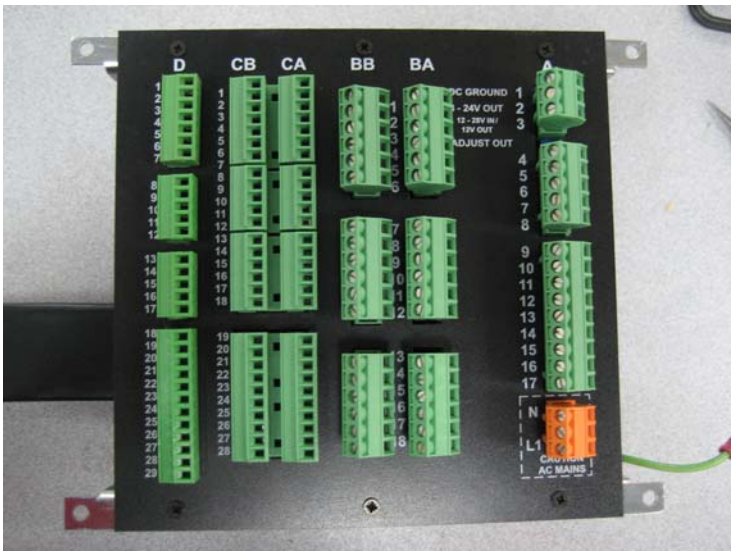

FIGURE 3-1 Main electronics module

☛ To replace the main electronics module

1. Place the replacement module in position and then replace the Allen screws in the rear of the module. As you do, connect the earth connector on the replacement module in the same position as it was on the module you removed.
2. Plug the cable connector to the door.

NOTE: Do not force the connector. It will fit in only one orientation.

3. Plug the green connectors into the communications plate according to the notes you made in the removal procedure.

CAUTION

CAUTION! Make sure that the earth is connected to the module before closing the door of the instrument.

4. Replace the 16 screws that are on the front of the door.
5. Follow site procedures for turning on the instrument.

6.4.2 Display Electronics

FIGURE 3-2 View of the back of the instrument door, showing the display electronics module

☛ To remove the display electronics module

1. Read and comply with the notes in "Important Notes" on page 6-1.
2. Remove all cables that are connected to the door. These will include a 50 mm wide ribbon cable (main enclosure only), and a small white 6-pole connector.

CAUTION

CAUTION! Support the module while removing it.

3. Remove the 4 mm screws located at each corner using a Phillips head screwdriver.

NOTE: Retain the 4 x 19 mm nylon spacers for use in the replacement procedure.

☛ To replace the display electronics module

Replacement is the reverse procedure.

6.5 Card (PCB) Replacement

☛ To replace a card

1. Read and comply with the notes in "Important Notes" on page 6-1.
2. Remove the 16 screws that are located on the front of the door with a 6 mm Allen key. The door is supported by the removable hinges on the left side of the enclosure.

3. Open the door and then remove the green connectors that plug into the main electronics in slots A, B, C and D.
4. Remove the 6 Phillips head screws that hold the cover plate and then remove the cover plate.
5. Identify the PCB to be replaced and remove the PCB by pulling on the green sockets that are attached to the PCB.
6. Position the replacement PCB so that the PCB is in the guides and then replace it by pushing on the green connectors.
7. Refit the cover plate.
8. Refit all the plugs into the correct slots A, B, C and D according to the positions you recorded before removing them.
9. Close the door and replace the 16 screws.
10. Follow site procedures for connecting power to the instrument and turning it on.
11. Check all setup parameters. If necessary, reprogram the instrument.

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CHAPTER 7 AUTOMATED PROVING MODE

Use Automated Proving Mode to calibrate meters.

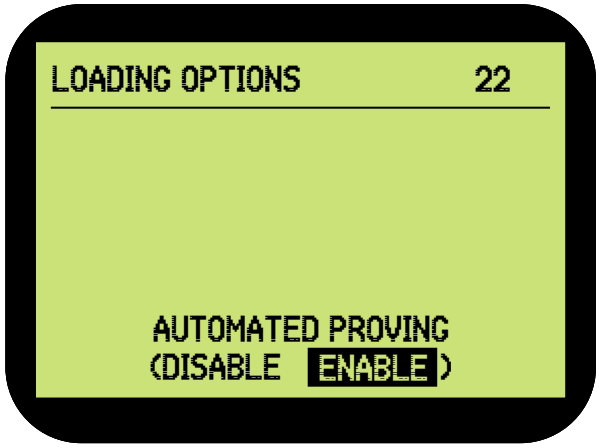
NOTE: Automated Proving mode should only be used in conjunction with Stand Alone mode

Calibrate meters during site commissioning and periodically, based on requirements at your site.

Before using Automated Proving Mode, the k-factors for each meter that is being used with the instrument must be entered. For more information, see the Programming Manual. The k-factor should be supplied with the meter's certificate of calibration.

To use automated proving mode, you must enter Programming Mode using the Weights and Measures switch. For more information, see “Entering and Exiting Programming Mode” in the Programming Manual.

☛ To enter Automated Proving Mode, enter Programming Mode, then select SYSTEM > LOADING OPTIONS > AUTOMATED PROVING > ENABLE.



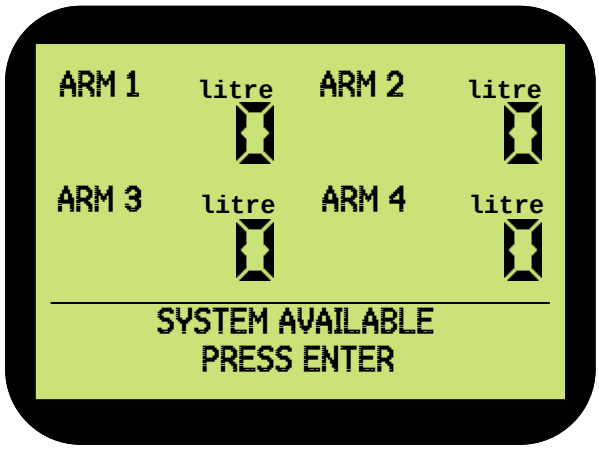
NOTE: It is often convenient to enable Test Mode when performing a meter calibration. This prevents the prompts from timing out and the instrument moving to the next screen automatically.

Once Automated Proving Mode is enabled the instrument is ready to calibrate the meter. The following example demonstrates the Automated Proving Mode workflow.

NOTE: The configuration of the instrument at your site may result in the screens being different from those shown in this example.

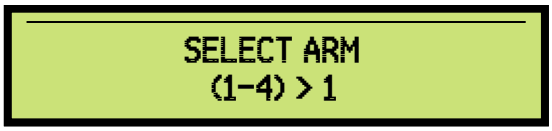
Before commencing meter calibration ensure that the calibrated proving meter is connected to the appropriate loading arm and take all normal loading precautions.

1. Press Enter at the following prompt to start the loading sequence.

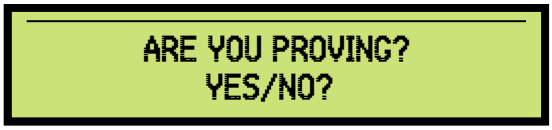


2. Enter a load number for the proving load.

3. Select the arm associated with the meter that is being calibrated.

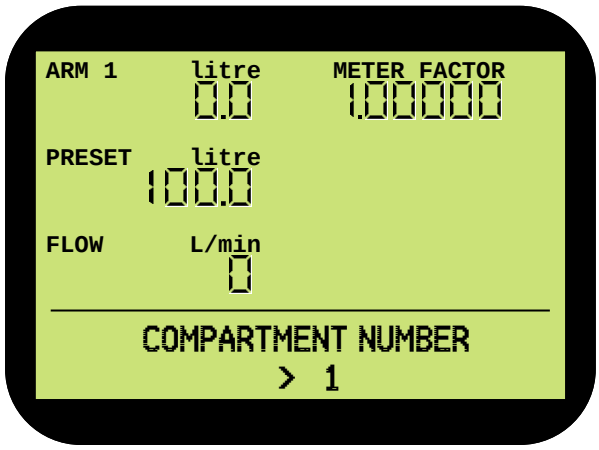


4. Press the Enter/(Yes) key to indicate you wish to perform automated proving with this load.



5. Enter a compartment number for the automated proving batch.

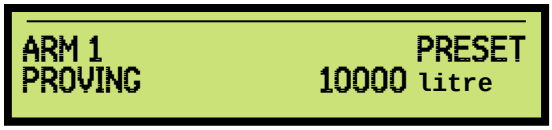
   The main instrument changes to display only information associated with the meter being calibrated. At this point you will not be able to start a simultaneous load on another arm.



6. Enter the preset amount required to perform a single meter calibration batch.

This will depend on the requirements of the person carrying out the meter calibration. The default is 100. In this example we will enter 10000 litres.

7. Press the START key to start the batch. The screen will then revert to the Service Display with an indication that proving is in progress.



8. Once the batch is complete you will be prompted for the proving volume. This is the volume as measured by the calibrated flow meter that you placed in-line with the meter being calibrated.

9. The instrument displays the calculated meter factor based on the current meter k-factor and the proving volume entered.

   Use the Display key to scroll through the options and press Enter to select an option. The options are as follows:

- ACCEPT

  The instrument saves the displayed value as the meter factor. Continue from step 10.
- DECLINE
  The instrument does not save the meter factor.
  Continue from step 10.
- RE-ENTER VALUES
  The instrument does not save the meter factor, and continues from step 8.
- ENTER MANUALLY
  Use alphanumeric keypad to enter a value for the meter factor. Press Enter to save the value in the instrument.

  After you enter the manual value the instrument prompts for the proving volume again, as in step 8. Press Cancel if the value is not to be recalculated based on the completed load, otherwise enter the volume and then repeat this step.

10. The instrument prompt asks if you want to load another compartment.

- Press Enter/(Yes) to continue from step 3.
- Press Cancel/(No) to end the loading process return to step 1.

After accepting factors for all meters:

1. Disable automated proving mode (and test mode, if you enabled it).
2. Request that the person certifying the instrument place the lead seals on the Weights and Measures switch and on the Weights and Measures bolt on the instrument case.

CHAPTER 8 FIRMWARE UPDATE

8.1 Description

8.2 Tools Required

The following tools are necessary to update the firmware:

- Honeywell Enraf 1010 instrument with
  - SP10CPU-C00-I3 card installed
  - CJ application pack loaded and working
- Personnel computer with
  - Serial communications port (interface (RS232/RS422/RS485) will depend on how the target instrument is configured)
  - Windows 2000, XP, or Vista
- Application binary file (version V02_000 or greater)
- 1010_Flash_programmer_V2.exe (1010 programming utility)

8.3 Instrument Configuration

Before updating the firmware, configure the instrument as follows:

- Enable Master Authorisation.
- Enter a Master Authorisation ID. For more information, see “Edit Master IDs” in the Programming Manual.
- From the main menu, select SYSTEM > COMMUNICATION > PORT 1 and then enter the instrument address. For more information, see “Communications” in the Programming Manual.

8.4 Updating the Firmware

To update the firmware, perform the following procedures in the order given:

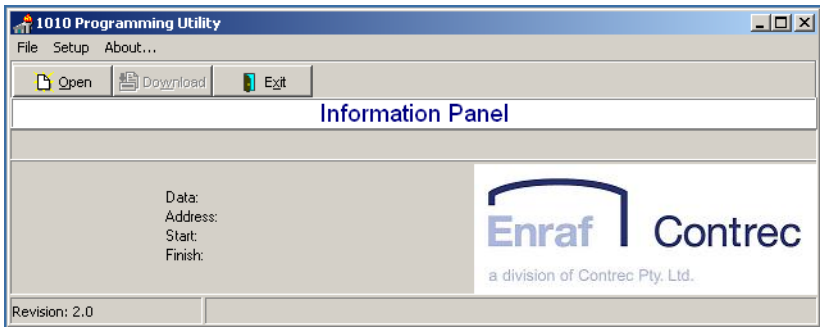
1. "Run the programming utility" on page 8-1.
2. "Activate the 1010 flash boot loader program" on page 8-2.
3. "Download the firmware" on page 8-5.

If you encounter problems during these procedures, see "Trouble Shooting Firmware Updates" on page 8-7.

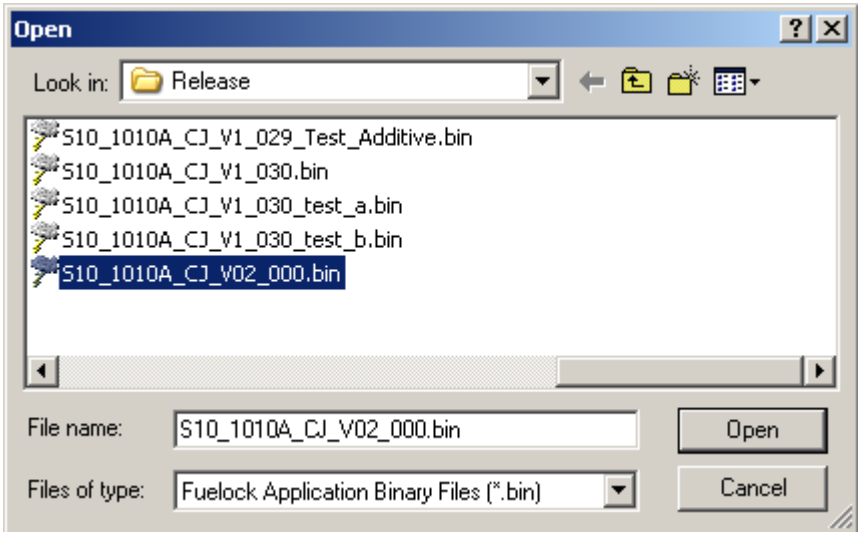
☛ Run the programming utility

1. Save the application binary file and the programming utility to a temporary folder on the host computer (for example c:\1010 Upgrade).
2. Run the programming utility from the temporary folder.

The Programming Utility dialog box appears.



3. Click “Open”. The Open dialog box appears.



4. Navigate to the temporary directory, select the application binary file and then click “Open”.

☛ Activate the 1010 flash boot loader program

1. Do one of the following:
   - Hold the '8' key down for five seconds.
     After using this method, you cannot alter certain parameters for W&M.
   - Use the switch on the instrument.

On the Model 1010A the switch is located on the right hand side of the enclosure. This switch may be fitted with a lead tamper seal for W&M requirements.

FIGURE 3-1 Model 1010A instrument switch

If the instrument is not idle (for example, the instrument is in use by an operator, or a vehicle overfill or earth system is connected) it displays the following:

- In this case, either disconnect the permissives to bring the instrument to the idle state, or wait until loading is complete and then enter your password.

If password mode is available the instrument displays the following:

2. Enter the password for the flash boot loader program (35274).

   The instrument prompts for a master PIN.

3. Enter any valid MASTER ID PIN currently stored in the 1010 software.

NOTE: The Master ID can be also be configured for touch/NexWatch/ RF ID. In this case present a valid key or card to the applicable reader. For more information, see "Edit Master IDs in the Programming Manual".

The instrument displays “MASTER ID AUTHORISED” for 3 seconds and then displays “SELECT COMPORT”, with a list of communications ports.

4. Use the Display key to scroll through the options and Enter to select the communications port to which the PC performing the firmware update is connected. The default port is PORT 2.

NOTE: The cables sent with the instrument are configured for communications port 2.

The instrument prompts for more communications port parameters. Repeat step 4 for each prompt. The following table lists the default options. We recommend using the default options.

NOTE: If you are using version 2 of the programming utility, you must set the Unit Address to 1. If you are using subsequent versions, you can set the address to another value, but the unit address set in the programming utility must match that set in the instrument.

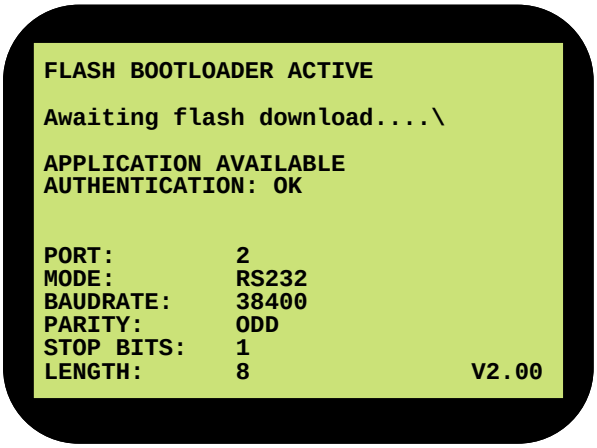
.

Prompt	Default
SELECT COMPORT	PORT 2
COMMS MODE	RS232
BAUDRATE	38400 - See Note
PARITY	ODD
STOPBITS	1 Do not change this.
UNIT ADDRESS	1

NOTE: 38400 is the highest baud rate. Depending on the wiring length you may need to reduce the baud rate to avoid communication errors. Reducing the baud rate will increase the time it takes to upgrade the firmware.

After you select an option from the last prompt, the instrument reboots and enters the “Flash Boot Loader” application where it will wait for the firmware update data from the PC. If the Flash Boot

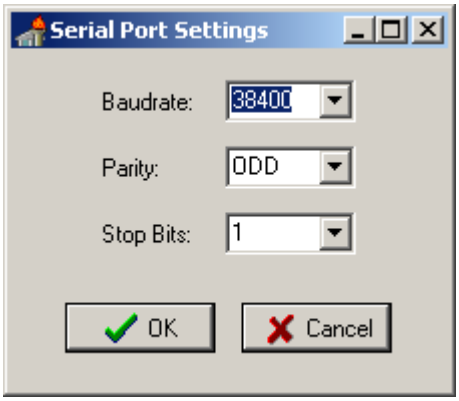
Loader detects no activity for greater than 10 minutes it will reboot the 1010 and return back to the 1010 application.



☛ Download the firmware

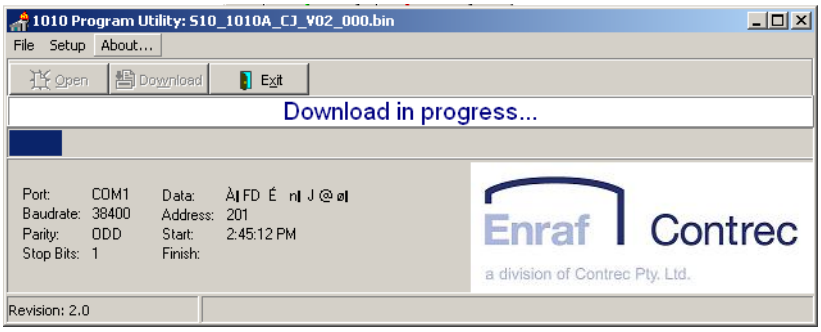
1. From the Programming Utility dialog box on the PC, click “Setup” > “Serial Port Setting”.

   The Serial Port Settings dialog box appears.

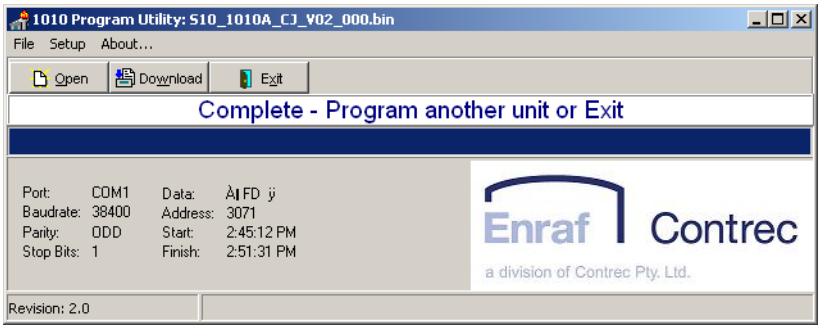


2. If necessary, change the port settings to match the instrument settings and then click “OK”.

3. Click “Download” to commence the firmware update. This will take up to 6 minutes at the 38400 baud rate.

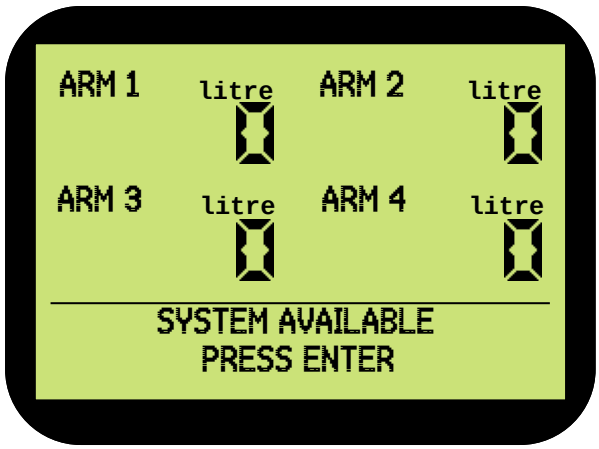


Once the download completes successfully, the instrument will reset and automatically run the new application software.



4. If there are no more instruments to program, click “Exit” to close the Programming Utility.

   The instrument reboots and automatically runs the new application software.



8.5 Trouble Shooting Firmware Updates

8.5.1 Time-outs

Programming Utility times out during the update.

Possible Cause Communication errors.

Solution Reduce the baud rate at both the instrument and the computer and try again.

8.5.2 Comms test failure

Programming Utility shows “Comms Test Failed - no response”

Possible Cause Another program may have exclusive access to the serial communications port on your computer.

Solution Close the other program.

Possible Cause Wiring problem resulting in no serial communications between the instrument and the computer.

Solution Check the wiring connections.

Possible Cause The wiring is too long.

Solution Reduce the baud rate and try again.

Possible Cause Instrument address was not set to 1 if using programming utility V2 otherwise the instrument address may not match that set in the programming utility.

Solution Begin from "Activate the 1010 flash boot loader program" on page 8-2, making sure to set the instrument address to 1 at step 4.

8.5.3 Incorrect Checksum

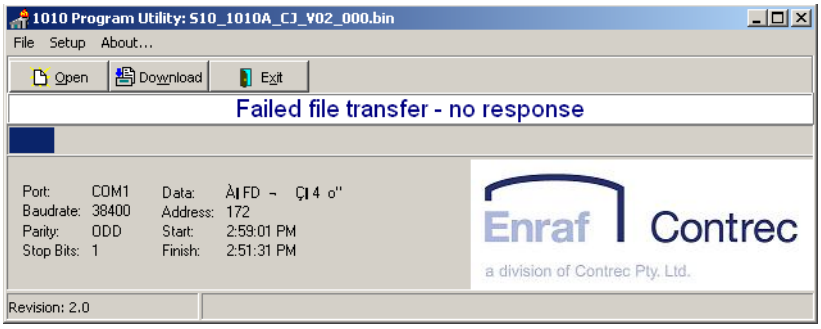
The programming utility displays the message “Incorrect checksum in file, file was not downloaded”.

Possible Cause The binary file is corrupt.

Solution Obtain a new binary file.

8.5.4 Communications failure during download

If communications fail during the download process the following message appears:



Possible Cause Communications link removed.

Solution

1. Turn the instrument off and then on.
2. Identify the cause of the communications failure and fix it. For example the serial connection may be removed from the PC. For more information, see “Wiring” in chapter 9.
3. Start the download again.

NOTE: *The 1010 application be unavailable if the download process did not complete, and the instrument will power up with the boot loader active and authentication failed. To make the application available, repeat the programming procedure beginning step 1 on page 8-5.*

CHAPTER 9 TROUBLE SHOOTING

9.1 Description

In the event of system failure, the ability to quickly identify the source of the problem and take corrective action to minimize downtime will help maintain a high level of productivity.

If the instrument encounters a problem, it will attempt to identify the problem and display a message indicating the source.

Due to the limited test equipment which may be taken into a hazardous area, the instrument internal Hardware Test program (see CHAPTER 5 "Hardware Test") can be an asset in isolating problems.

9.2 Wiring

Wiring can be a common source of problems in any installation, causing both intermittent and total failures, such as:

- Broken wiring due to physical damage
- Ingress of water at junction boxes, causing corrosion and short circuits
- Intermittent failures due to incorrect cable type, particularly in high speed communications lines
- Screens not terminated correctly, causing earth loops

9.3 Power Supplies

A number of devices connected to the instrument may require power, such as temperature probes, and flow meters and signal isolators/ amplifiers. Check for other devices connected to the same power supply as they may be the cause of the problems.

It is recommended not to power the NexWatch card reader off the instrument power supply. The instrument 12VDC be used, but only if no other devices are powered off this output, otherwise operation of the card reader can not be guaranteed. An independent power supply is recommended for the Nexwatch card reader. See the Card Descriptions and Wiring Manual for details.

Always ensure that the maximum current draw of the devices attached to the instrument power supply outputs does not exceed the maximum current rating:

- 250 mA max for the 12 Vdc output
- 100 mA max for the adjustable output

For more information, see “Power Supply Card—S800PS4-6” in the Card Descriptions and Wiring Manual.

9.4 Emergency Stop

If the instrument displays the message “Clear Emergency Stop”:

- Check the status of the Master Emergency Stop switch
- Use the Input Test in the Hardware Test Program (see CHAPTER 5) to monitor the status of the input
- To operate, the instrument must “see” a closed contact.

9.5 Pulser Error

A Pulser Error, known in the system as a flowmeter error, occurs when the instrument is set up for dual input (2 signal outputs from the flowmeter) but the instrument only detects a single input. This error may be due to:

- Pulser failure
- A wiring problem

9.6 Timeout Error

A Timeout Error occurs when the instrument does not receive pulses from the flowmeter for a time exceeding the SIGNAL TIMEOUT value, as programmed in the Setup Mode.

This may be due to a number of factors, such as:

- Signal timeout value too small to allow flow to start
- A blocked pipe
- A manual valve closed
- The flowmeter is damaged
- The control valve not working correctly
- The pump is not working
- Wiring to pump is damaged
- Wiring to the isolation valves is damaged

9.7 Scully Overfill

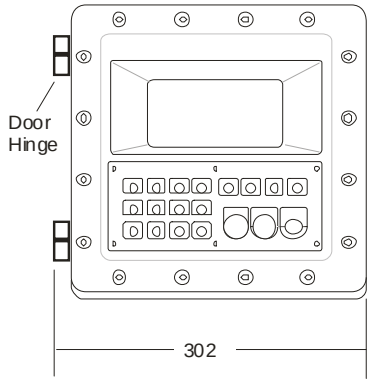
If the instrument displays the message, “Reconnect or Clear Overfill/ Ground”, the Scully overfill system has been activated. If the problem continues to occur, check the:

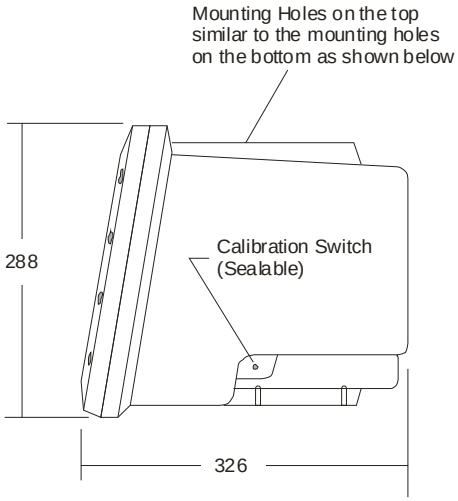
- Condition of the truck connection for corrosion, broken contacts, etc.
- Scully relay contact to the instrument. Use the input test in the Hardware Test Program (see CHAPTER 5) to monitor the status of the input.

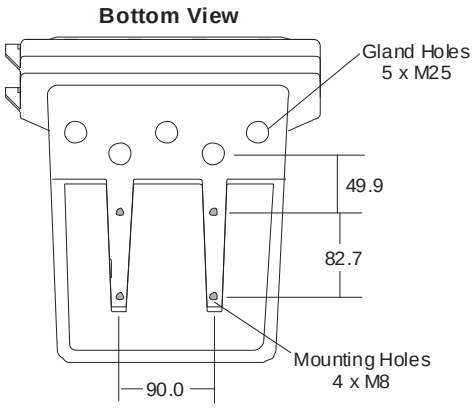
APPENDIX A DIMENSION DRAWING

Material: Cast Aluminium
Finish: Light beige powdercoat

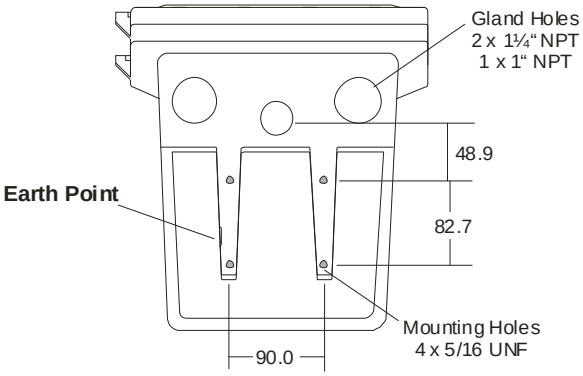
Dimensional Diagrams







Enclosure with 5 x M25 Gland holes



Enclosure with 2 x 1¼" NPT and 1 x 1" NPT Gland holes

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GLOSSARY

authorisation Type of authorisation. Can be PIN, touch key, RF ID, or NexWatch. For more information, see chapter 8 “Authorisation Entry Mode” in the 1010CJ Programming Manual.

authorisation number A number that is programmed into the instrument to allow access to the instrument after presenting *authorisation*.

batch Individual loading of product using a single loading arm.

BOL Bill of Lading. A document that is used to acknowledge the receipt of a shipment of goods.

computer A computer, Distributed Control System (DCS), Load Rack Computers (LRC), or Terminal Automation System (TAS) that is attached to an instrument.

entry term formally used to describe a batch

extended wait period Time, in addition to the wait period, required because a command prevents the instrument responding for an extended time.

instrument A 1010 Loading System.

References to 1010-1 (Single arm unit), 1010-2 (two arm unit) and 1010-4 (four arm unit), relate to those models of the generic Model 1010 loading system.

intelligent additive injection An automated additive injection system that connects to the instrument by a serial communications port. Mini-Pak is one example of this.

load *See also* “batch”

Honeywell Enraf Mini-Pak *See* “Mini-Pak”

Mini-Pak An automated additive injection system.

OIML International Organization of Legal Metrology

proving run One completed batch or loading operation carried out with the Automated Proving Mode enabled.

service display Two line display that shows the loading information for a selected parameter for the selected arm.

unathorised flow Flow that is recorded by a meter without being authorised (by an operator pressing the START key button).

unit address The address byte a computer uses to direct information to the desired instrument

wait period The time the computer waits for a response after sending a command to the instrument. Generally 300 millisecond.

See also “extended wait period”.

Weights and Measures switch A switch that is mounted on the instrument exterior, that be fitted with a lead tamper seal for W&M requirements.

On the Model 1010A the switch is located on the lower right-hand side of the enclosure.

Honeywell Enraf

2000 Northfield Court,

Roswell, GA 30076

U.S.A.

Tel: +1 770 475 1900

Email: enraf-us@honeywell.com

www.honeywellenraf.com

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